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DOT ARCHITECTURE FOR MUTI-CLOUD SYSTEM

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ABSTRACT: IT enterprises have recently witnessed a dramatic increase in data volume and faced with challenges of storing and retrieving their data. This work analyzes about find DOT Frame work. This work also analyzes frame work for different Architectures on cloud storage and also proposed an algorithm for CSC and also proposed an algorithm for TCC. Results confirm the importance and effectiveness of the proposed algorithms and highlight the benefits of leveraging pricing differences and data migration across cloud storage providers (CSPs).

Keywords: DOT, LCC, TCC, CSC, NBP.

I. INTRODUCTION

We proposed a Cloud Storage Layered Architecture for best Store and Retrieve image dataset on multiple cloud environments. It means at a time Image Data Set information store and retrieve in multiple clouds. In this process user send Image Data Set to DOT Frame Work, DOT Frame work do some process and send Image Data Set store in multiple clouds.

We use the below given Cloud Storage Layered Architecture we explain process of multiple Cloud environments.

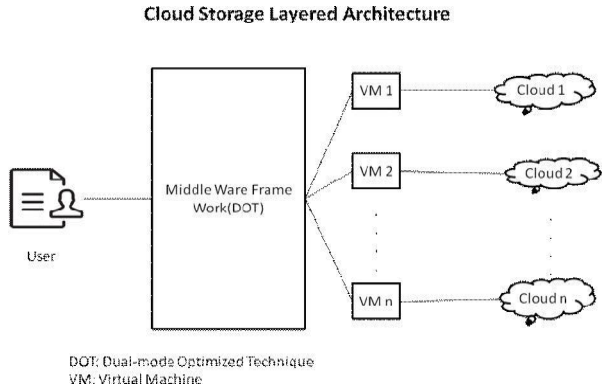

Figure 1: Cloud Storage Layered Architecture

DOT: Middle Ware Frame Work also called "DOT (Dual-Mode Optimized Technique)" for Storage and Retrieve on Multiple Clouds. We use the below given DOT Framework Block Diagram and explain the DOT process. DOT Frame Work has two modes given below i.e.

LCC: In which multiple clouds will be in sequence i. e one after one It is best suitable for small scale data set (SSDS).

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TCC: In which multiple clouds are accessed concurrently or simultaneously. It is best suitable for large scale data set (LSDS).

DOT Process:

User sends Image Data Set to DSSE (Data Set Size Evaluator). DSSE take Image Data Set and evaluate based on Image Data Set Size. Image Data Set Size is small select LCC otherwise select TCC. We use LCC store and retrieve Image Data Set in Cloud sequentially. We Use TCC store and retrieve Image Data Set in Cloud concurrently.

The DOT Framework Block Diagram is given below i.e

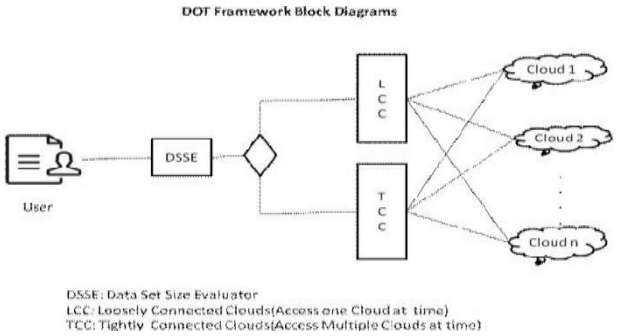


Figure 2: DOT Architecture

DSSE: User selects either LCC or TCC. Default it will select LCC.

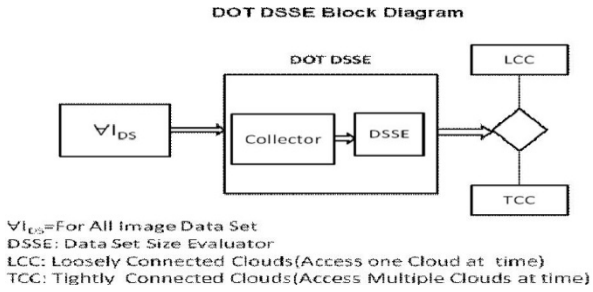


Figure 3: DOT DSSE Architecture

II. LCC INTERNAL STRUCTURE:

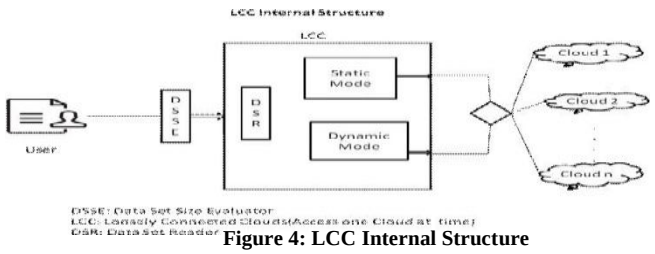


Figure 4: LCC Internal Structure

Static Mode:

In Static Mode Image Data Set store one cloud at time. If first CSP check available space and store image dataset in first CSP.

Static Mode Algorithm:

Input: Image Data Set ($\forall I_{DS}$)
Output: Store $\forall I_{DS}$ in CSP's

Begin

User priorities the CSP's.

mRead Image Dataset Size.

Compare size with available space in cloud 1

If size match upload

Else consider next cloud in the sequence.

Repeat same if mismatch.

End

Dynamic Mode:

This mode address most important limitation of the cloud called network bandwidth limitation.

The network bandwidth of clouds are not always fired they are changing dynamical. Some cases service provider will reduce the bandwidth.

For Example Google have provision to customize the bandwidth.

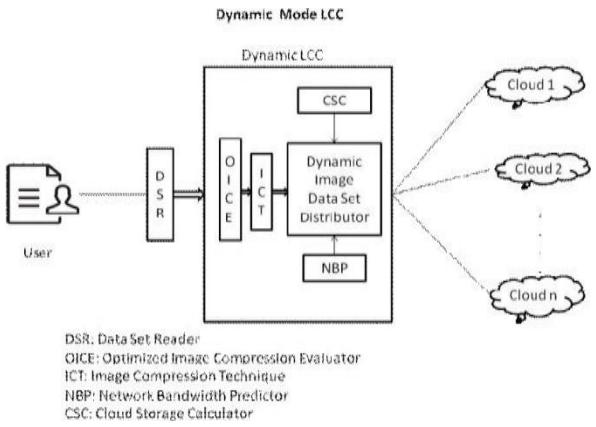


Figure 5: Dynamic LCC

DSR: it's accept data from User and gives to Dynamic LCC

CSC: it identifies the appropriate cloud storage providers by computing size of space with image set size limit at CSPs (CSP1, CSP 2, …….., CSP n).

CSC (Cloud Storage Calculator)

CSC: Cloud Storage Calculator calculates Cloud maximum storage space, Cloud Used Space and Cloud Free Storage Space. It's also generating a Report of all clouds, Bandwidth of all clouds, maintain SP (Storage Space) of n-clouds and those report pass to next level of architecture.

List of Abbreviations Used in CSC

F_{si}=Free Size in CSPi

C_{Mi}= Max Storage Size in CSPi

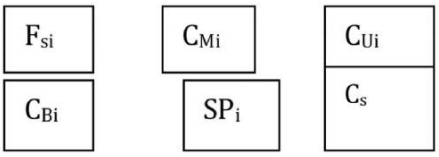
C_{Ui}= Utilize Size in CSPi

C_{Bi}= Bandwidth of CSPi

SP_i = Storage Space of CSPi
$\forall I_{DS}$=For All Image Data Set
C_s=After Copression Size of $\forall I_{DS}$

C_{SC} Consists:

CSC Consists:



Calculate Each CSPi Fsi, SPi, CMi, CUi, CBi;

Max Storage Size in CSP_i = C_{Mi}= Read CSP_i Max Size;

Utilize Size in CSP_i = C_{Ui} =Read CSPi Utilize Size;

Bandwidth of CSP_i = C_{Bi} = Read CSP_i Bandwidth;

Free Size in CSP_i = $\sum_{i\,1}^{n} F_{si} = \sum_{i\,1}^{n} C_{Mi} - \sum_{i\,1}^{n} C_{Ui}$;

If Cs < = $\sum_{i\,1}^{n} F_{si}$

n

Calculate SPi = $\sum_{i\,1} C_{Ui} + C_s$;

//Algorithm for CSC (Cloud Storage Calculator) Algorithm:

Input: All CSPs C_{Mi}, C_{Ui}, C_{Bi};

Output: All CSPs F_{si}, S_{Pi};

Read C_{Mi}, C_{Ui}, C_{Bi}, F_{si}, S_{Pi}, i;

Begin

for i ← 1 to n

Read C_{Mi}, C_{Ui}, C_{Bi};

Calculate F_{si},= C_{Mi} - C_{Ui};

If Cs < = F_{si},

Update S_{Pi} = C_{Ui} + C_s;

Update(CUi ,SPi);

End for

End

OICT: Same as a chapter 1 OICT.

NBP (Network Bandwidth Predictor)

NBP: IT accept all suitable cloud service providers (CSPs); And Predicts most reliable CSP based on learning algorithm.

NBP: NBP take Current CSP Bandwidth input and gives reliable bandwidth CSP output.

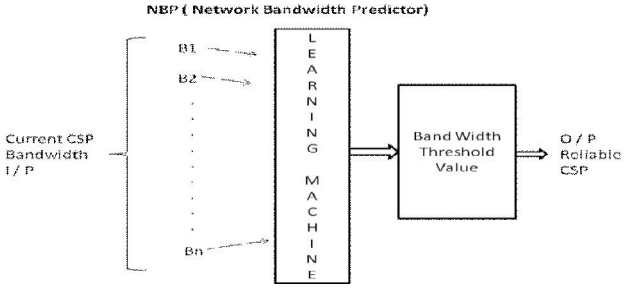


Figure 6: Network Bandwidth Predictor (NBP)

Calculate NET= O1W1+O2W2+.....+OnWn= $\sum_{i=1} OiWi$

Calculate OUT=F (NET)

Dynamic Image Data Set Distributor:

Dynamic Image Data Set Distributor collects information and store image dataset in Clouds.

//Algorithm for Dynamic LCC Algorithm:
Input: Image Data Set ($\forall I_{DS}$)
Output: Store $\forall I_{DS}$ in CSP's

Begin

Read $\forall I_{DS}$.

Call (NBP Algorithm);

Call (GQA Algorithm);

Call (CSC Algorithm);

If size match upload

Else consider next cloud in the sequence.

Repeat same if mismatch.

End

Tightly Connected Clouds (TCC)

Tightly Connected Clouds (TCC): It is suitable for large scale image data sets, where single cloud space not available accordingly.

The internal structure of TCC as shown in the Fig.7:

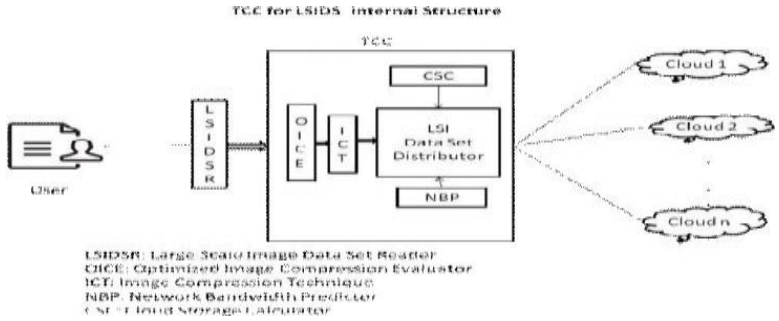


Fig. 7: Tightly Connected Clouds (TCC)

//Algorithm for TCC Algorithm:
Input: Image Data Set ($\forall I_{DS}$)
Output: Store $\forall I_{DS}$ in CSP's

Begin

Read $\forall I_{DS}$.

Call (NBP Algorithm);

Call (GQA Algorithm);

Call (CSC Algorithm);

If size match upload

Else consider next cloud in the sequence.

Repeat same if mismatch.

End

Large Scale Video Process:

Large Scale Video Up loader Block Diagram

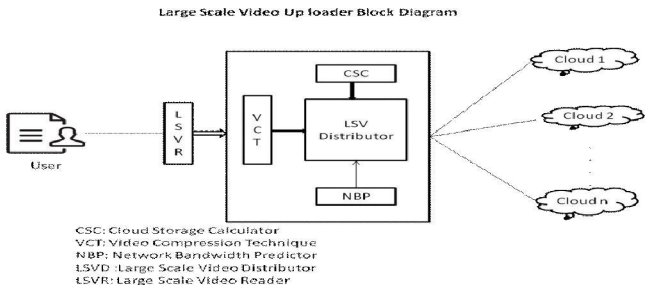


Fig.8: Large Scale Video Up loader

LSVR: User sends Large Scale Video to LSVR (Large Scale Video Reader) .LSVR Receive LSV (Large Scale Video) and forward to VCT (Video Compression Technique).

VCT: VCT receive LSV, Apply OICE (Optimized Image Compression Evaluator) compress LSV and send to LSVD (Large Scale Video Distributor).

VCT Block Diagram:

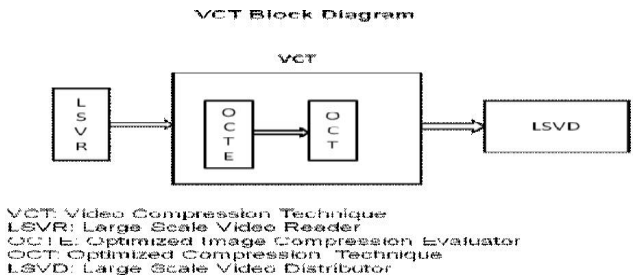


Fig.9: VCT Block Diagram

CSC: Same as a TCC CSC

NBP: Same as a TCC NBP

LSVD: LSVD receive information of VCT, CSC and NBP and apply the LSV process.

IV. LSV PROCESS

List of Abbreviations Used in LSV Process

V= Large Scale Video

C_{Bi}= Cloud Bandwidth of i

T_B= Total All Clouds Bandwidth

V_{Size}= V Size

U_B= Unit Bandwidth

C_{Total}= No. Of Used CSPs

$\in V_i$ = Sub Set of V of i

Calculate $T_B = C_{B1} + C_{B2} + \ldots\ldots\ldots\ldots\ldots\ldots + C_{Bn}$;

$$T_B = \sum_{i=1}^{n} C_{Bi}\ ; \quad (0.1)$$

$$\text{Calculate } UB = \frac{V_{Size}}{T_B}\ ; \quad (0.2)$$

Formula $V \subset \in V_i$;

$$\in V_i = \in_{V1} + \in_{V2} + \ldots\ldots\ldots\ldots\ldots\ldots + \in_{Vn}$$

$$V_i = \frac{\in V_i}{1}\ ;$$

Calculate $\in Vi = C_{Bi} * UB$; (0.3)

Now

V1 = CB1 * UB;

.

.

$\in Vn = CBn * UB$;

Example:

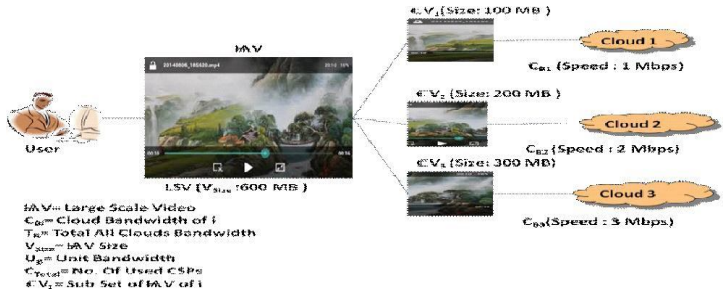


Fig10: Example of LSV Process

V. RESULTS

Multi-Cloud System Video Storage Time Calculation

DS=614400 KB TOTAL_BW_SIZE=294 Kbps UNIT _SIZE=614400/294=2089.8

DS	Total Size	Cloud Name	Bandwidth	Time
SDS 1	112849.2 KB	Drop Box Drive	54 Kbps	2089.8 Sec
SDS 2	213159.6 KB	Google Drive	102 Kbps	2089.8 Sec
SDS 3	288391.2 KB	One Drive	138 Kbps	2089.8 Sec

Multi Cloud System Video Retrieve Time Calculation

DS	Total Size	Cloud Name	Bandwidth	Time
SDS 1	112849.2 KB	Drop Box Drive	54 Kbps	2099.8 Sec
SDS 2	213159.6 KB	Google Drive	102 Kbps	2099. /Sec
SDS 3	288391.2 KB	One Drive	138 Kbps	2099.7 Sec

Fig.11:Multi-Cloud System Video Time Calculation

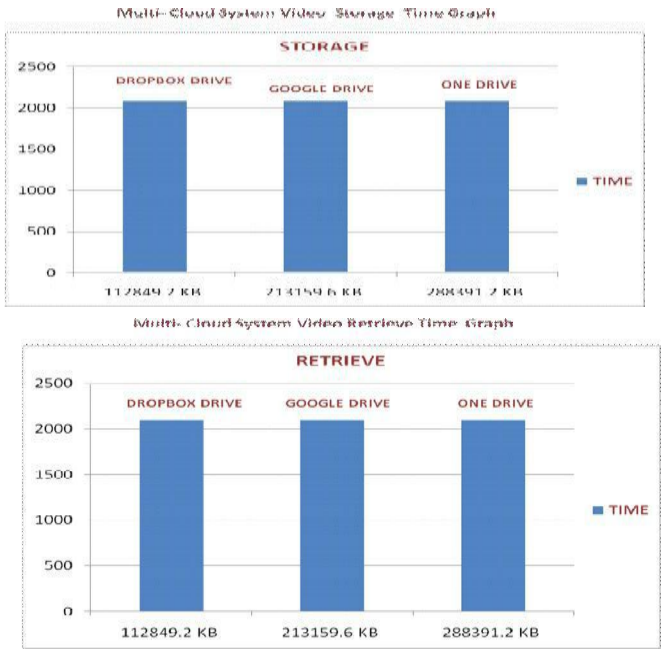


Fig.12:Multi-Cloud System Video Time Graph

//Algorithm for Large Video process uploading downloading in Cloud

Input: V Large Scale Video

Output: Store V in all clouds

Read V, C_{Bi}, **T**, V_{Size}, U_B, $C_{Totalii}$ Bandwidth

// V Large Scale Video //C_{Bi}= Cloud Bandwidth of i

//TB= Total All Clouds Bandwidth

//V_{Size}= V Size //U_B= Unit

//C_{Total}= No. Of Used CSPs //$\in V_i$ = Sub Set of V of i // Ci =CSP of i

Begin

Use 1.1 Calculate TB;

Us e 1.2 Calculate UB;

Use 1.3 Calculate ∈Vi ;

for i 1 to n
Upload ∈Vi sub video in Ci Cloud;

End for

End

VI. IDSR

IDSR: Image Data Set Retrieval is process of retrieve stored information from all clouds. Here information means ∀ I_{DS} (Image Data Set)

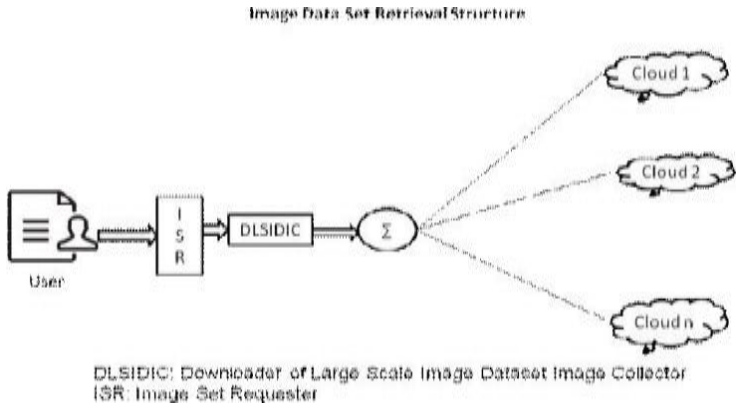


Fig.12:Multi-Cloud System Video Time Graph

Image Dataset Retrieval Process:

ISR: User send request to clouds those request is called ISR. ISR forward information to DLSIDIC.

DLSIDIC: DLSIDIC (Downloader of Large Scale Image Dataset Image Collector) search and collect information from clouds. DLSIDIC have collected information send to user.

DLSIDIC Block Diagram

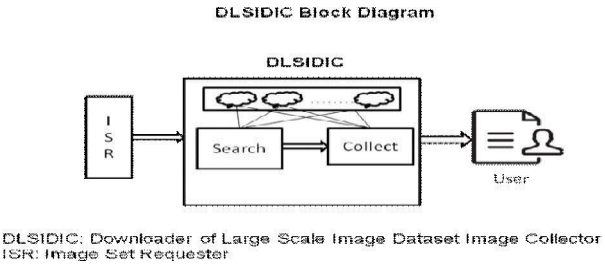


Fig.13: DLSIDIC Block Diagram

Procedure Retrieve images on Single CSPs

Step1: User send request to cloud for Image Dataset.
Step2: Search image Dataset in cloud.
Spet3: Cloud gives cloud result.
Step4: Send Result to User.
Step5: User select image dataset retrieve image dataset

Procedure Retrieve images on multi CSPs

Step1: User send request to all clouds for Image Dataset.
Step2: Search image Dataset in all clouds.
Spet3: Cloud 1 gives cloud 1 result… Cloud n gives cloud n result
Step4: Merge all Results

Step5: Send Result to User

Step6: User select image dataset retrieve image dataset

VII. CONCLUSION

The work has analyzed the most popular DOT Architecture Frame Work. This work also proposed an algorithm for Store Image Data Set in CSP's. This work finally proposed an algorithm for Retrieve images on Single CSPs and Retrieve images on multi CSPs.

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